

Claims

1. A fastener device, which is or can be fixed at one end to a first component by means of a joint which can be produced by a forming technique, preferably a riveted joint, and which has a receiving area configured or configurable to receive a bolt, a nut or another element, for example a bayonet part or a shaft, characterized in that the fastener device is configured in a region spaced from the first said end for frictional attachment or attachment by a forming technique onto or into a second component.
2. A fastener device in accordance with claim 1, characterized in that the spaced region is provided at the end of the fastener device opposite the first said end.
3. A fastener device in accordance with claim 1 or claim 2, characterized in that the spaced region is configured as a blind rivet sleeve.
4. A fastener device in accordance with one of the preceding claims, characterized in that the spaced region is configured for attaching by a forming technique to a second component or to a further region of the first said component.
5. A fastener device in accordance with claim 1 or claim 2, characterized in that the spaced region is configured for welding or bonding to a second component or to a further region of the first said component.

6. A fastener device in accordance with one of the preceding claims, characterized in that it is made in one part.
7. A fastener device in accordance with one of the preceding claims 1 to 5, characterized in that it is made in a plurality of parts.
8. A fastener device in accordance with claim 7, characterized in that it consists of a first fastener element which can be fixed to the first said component in the head region and leads into or onto a bar-shaped part and which is optionally bonded or welded thereto or fixed thereto by means of a pinched joint or by means of any other joint, with the bar-shaped part being attachable to the second component at its end opposite the head part of the fastener element either directly or via a further fastener element, with in the latter case the bar-shaped part possibly being bonded, welded or preferably fixed to the further fastener element by means of a form-locked and/or frictional joint, for example a pinched joint, with one of the two fastener elements preferably having a thread part (female thread or male thread) and the other a through bore.
9. A fastener device in accordance with one of the preceding claims, characterized in that it or a possible bar-shaped part is made as a spacer tube.
10. A fastener device in accordance with claim 9, characterized in that the spacer tube is equipped with a female thread preferably arranged adjacent to one of the ends of the fastener device.

11. A fastener device in accordance with one of the preceding claims, characterized in that the two ends of the fastener device are arranged offset relative to one another, for example by the use of a cranked bar-shaped part or spacer tube.
12. A fastener device in accordance with one of the preceding claims, characterized in that it has a female thread or a male thread for attaching a third component by means of a bolt or a nut.
13. A fastener device in accordance with one of the preceding claims, characterized in that the joint which can be made by a forming technique is configured for use with a pre-punched component, for example using a fastener device having rivet features of the kind of the RND, RSN, RSF, RSK, RSU, HI or UM nut elements or using a fastener device having shape features of the kind of the EBF, SBK or SBF bolt elements of the company of Profil Verbindungstechnik GmbH & Co. KG.
14. A fastener device in accordance with one of the preceding claims 1 to 12, characterized in that the joint which can be made by a forming technique is configured for use with a non pre-punched component, for example using a fastener device having integrated pre-punching, while utilizing a fastener device having shape features of the kind of the RSK or RSU nut elements of the company of Profil Verbindungstechnik GmbH & Co. KG or using a fastener device having self-piercing features, for example of the kind of the UM, HI, RSF nut elements or EBF bolt elements (in the self-piercing

version) or SBK or SBF bolt elements of the company of Profil Verbindungstechnik GmbH & Co. KG.

15. A fastener device in accordance with one of the preceding claims, characterized in that the first component and/or the second component are provided with cup-like recesses in the region of the attaching position of the fastener device.
16. A fastener device in accordance with claim 7 and one or more of the further, preceding claims, characterized in that a nut element having rivet or pierce and rivet features is used to create the joint made by a forming technique to the first component and the nut element either has a thread as usual or is provided with a through bore instead of a thread.
17. A fastener device in accordance with claim 7 and one or more of the preceding claims, characterized in that when a bolt element is used to create the joint made by a forming technique to the first component, the shaft part of the bolt element is either made hollow or has a solid design and is supplemented by a separate spacer tube and, where required, a nut at the side of the first component facing the second component, wherein, when a bolt element with a hollow shaft part is used, the male thread of the shaft part is capable of being screwed into a female thread of the spacer tube, and the attaching of the third component is effected via a screw which is led through the first component, the hollow shaft part and the spacer tube and which can be screwed either into a thread in the spacer tube at its end remote from the first component, or into a thread in

an element attached to the end of the spacer tube remote from the first component and joined to the second component by a forming technique or into a nut at the side of the second component remote from the first component wherein when a bolt element with a solid shaft part is used, the latter can be screwed either into a female thread having a spacer tube, with the attaching of a third component then being effected on the side of the second component remote from the first component by means of a screw which engages into a female thread in the spacer tube, or projects through the spacer tube and the second component and cooperates there with a separate nut arranged on the side of the second component remote from the first component for attaching a third component.

18. A fastener device in accordance with claim 9, characterized in that the spacer tube is provided at its end or at both ends with a nose or a plurality of noses configured to engage into one or more corresponding recesses at the joint position associated with the spacer tube at the first and/or second component.
19. A fastener device in accordance with claim 3, characterized in that the fastener device is equipped with a mandrel with a pre-determined position of fracture whose head is configured to deform the blind rivet sleeve when tensile forces are applied to the shaft part of the mandrel, with the head part of the mandrel being configured either for removal from the region of the fastener device after the deforming of the blind rivet sleeve or for a form-locked and/or frictional retention with the fastener device by the provision

of shape features such as an undercut in the shaft part adjacent to the head.

20. A fastener device in accordance with claim 3 and claim 19, characterized in that the blind rivet sleeve merges into a shoulder arranged in the region of the side of the second component facing the first component.
21. A fastener device in accordance with claim 20, characterized in that a second shoulder is arranged between the blind rivet sleeve and the first shoulder and has a diameter which is greater than the outer diameter of the blind rivet sleeve, but smaller than the outer diameter of the first shoulder, and has a height which corresponds preferably at least approximately to the thickness of the second component in the region of the rivet sleeve.
22. A fastener device in accordance with claim 20 or claim 21, characterized in that it is configured for use with a pre-punched second component whose aperture is provided with an at least substantially conical collar protruding at the side of the second component remote from the first component and in that the blind rivet sleeve and the mandrel of the fastener device are configured to press the collar at least substantially flat via the blind rivet sleeve when the mandrel is tightened in accordance with the procedure in the performance of the so-called fastening hole riveting method (EP 0 539 793).

23. A fastener device in accordance with one of claims 3 and 19 to 22, characterized in that a thread is provided in the fastener device between the rivet sleeve and the first component to receive a screw inserted from the side of the first component remote from the rivet sleeve and preferably has a core diameter which is somewhat larger than the outer diameter of the shaft part of the mandrel.
24. A fastener device in accordance with one of claims 3 and 19 to 23, characterized in that the shaft part of the mandrel is provided with shape features to allow a reliable grip of a pulling tool.
25. A fastener device in accordance with one or more of the preceding claims, characterized in that the formable ends of the fastener device are configured to generate a media-tight joint with the first and/or second component, with, where required, thermally stable adhesives being able to be used during the insertion of the fastener device to ensure gas-tight joints.
26. A combination of a fastener device in accordance with one of the preceding claims and a component or two or three components, characterized in that the joint which can be made by a forming technique is configured for use with a pre-punched component, for example using a fastener device having rivet features of the kind of the RND, RSN, RSF, RSK, RSU, HI or UM nut elements or using a fastener device having shape features of the kind of the EBF, SBK or SBF bolt elements of the company of Profil Verbindungstechnik GmbH & Co. KG.

27. A combination in accordance with claim 26, characterized in that the joint which can be made by a forming technique is configured for use with a non pre-punched component, for example while utilizing a fastener device having integrated pre-punching, using a fastener device having shape features of the kind of the RSK or RSU nut elements of the company of Profil Verbindungstechnik GmbH & Co. KG or using a fastener device having self-piercing features, for example of the kind of the UM, HI, RSF nut elements or EBF bolt elements (in the self-piercing version) or SBK or SBF bolt elements of the company of Profil Verbindungstechnik GmbH & Co. KG.
28. A combination in accordance with claim 26 or claim 27, characterized by a bolt whose head part is arranged on the side of the first component remote from the second component and whose shaft part extends through the first component and into the fastener element and is screwed into a thread which is located either between the first and second components in the fastener device or on the side of the second component remote from the first component.
29. A combination in accordance with claim 26 or claim 27, characterized in that the fastener device has a shaft part which projects through the second component and engages in a nut element on the side of the second component remote from the first component.
30. A combination in accordance with claim 26 or claim 27, characterized by a bolt whose head part is arranged on the side of

the second component remote from the first component and whose shaft part extends through the second component and into the fastener element and is screwed in a thread which is located either between the first and second components in the fastener device or on the side of the first component remote from the second component.

31. A combination in accordance with claim 26 or claim 27, characterized in that the fastener device has a shaft part which projects through the first component and engages in a nut element on the side of the first component remote from the second component.
32. A method of making a joint between a first and a second component using the fastener device in accordance with one of the preceding claims, characterized by the following steps:
 - a) making of a joint by a forming technique between the first said end of the fastener device and the first component;
 - b) introduction of the region of the fastener device spaced from the first end through a hole in the second component;
 - c) fastening of the fastener device to the second component in the spaced region; and
 - d) optionally making another type of joint such as a weld joint and/or a bond between the two components at one or more

positions remote from the fastener device, with step d) being able to be performed either before or after step c).

33. A method in accordance with claim 32, characterized in that step a) comprises either the pre-punching of the first component or is performed using a self-piercing design at the first said end of the fastener device.
34. A method in accordance with claim 32, characterized in that step c) comprises the bonding of the fastener device to the second component in the spaced region.
35. A method in accordance with claim 32, characterized in that step c) comprises the welding of the fastener device to the second component on the side of the second component facing the first component, but preferably on the side of the second component remote from the first component.
36. A method in accordance with claim 32, characterized in that step c) comprises the making of a rivet joint.
37. A method in accordance with claim 36, characterized in that the rivet joint is performed in the manner of a blind rivet joint using a mandrel performing the riveting, with the tightening of the mandrel being performed to make the rivet joint before or after step d).
38. A method in accordance with claim 32, characterized in that it is performed using a fastener device consisting of two elements, with

the first element being attached to the first component in step a), the second element being inserted into the second component in step b) and the joining of the two elements to one another being effected either by the insertion of a bolt through the one element into the other element or by fixing a nut to a shaft part of the one element provided with a thread, with, in this case, the shaft part of the one element extending through a bore of the other element or by a screw being led through both elements and being secured with a nut, with regions of the first and second elements located between the first and second components forming a spacer tube between these two components.

39. A method in accordance with claim 32 using a fastener device which consists of three elements, with the first element being joined to the first component in a forming technique to perform step a), the second element being fastened to the second component to perform steps b) and c), and the third element of the fastener device, which is formed as a spacer tube, being inserted between the first and second elements in a further step which can be performed at any time prior to step c).
40. A spacer tube which is pierced into a component at one end and which has the possibility of a further frictional and/or form-locked joint to the second component at its second end for piercing into or joining to the second component.
41. A fastener device in accordance with one of the preceding claims 1 to 25, which has a female thread to receive a bolt and a tubular

region, with the inner diameter of the tubular region being greater than the outer diameter of the bolt, characterized in that a conical insertion aid is provided in the tubular region in front of the thread or in that a centering sleeve is provided.